

PATENT COOPERATION TREATY
PCT
INTERNATIONAL SEARCH REPORT
(PCT Article 18 and Rules 43 and 44)

EXPRESS MAIL LABEL NO.
EV 125372650 US

Applicant's or agent's file reference 74872-167	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below	
International application No. PCT/CA2004/001510	International filing date (<i>day/month/year</i>) 16 August 2004 (16-08-2004)	(Earliest) Priority date (<i>day/month/year</i>) 15 August 2003 (15-08-2003)
Applicant ID BIOMEDICAL CORPORATION et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 8 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☒ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☒ **Certain claims were found unsearchable** (see Box No. II).

3. ☒ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows :

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ as selected by this authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☒ none of the figures is to be published with the abstract.

Box No. 1 Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:
 - a. type of material
 - ☒ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☒ in written format
 - ☒ in computer readable form
 - c. time of filing/furnishing
 - ☒ contained in the international application as filed.
 - ☒ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
2. ☒ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments :

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1. ☒ Claim Nos. : 25-31

because they relate to subject matter not required to be searched by this Authority, namely :

Although claims 25-31 are directed to methods of medical treatment of a human/animal body which the Authority is not required to search under Rule 39.1(iv) of the PCT, the search has been carried out based on the alleged effects of the compounds referred to therein.

2. ☐ Claim Nos. :

because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :

3. ☐ Claim Nos. :

because they are dependant claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows :

see extra sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos. :
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos. :

claims 1-37, partially (Group I, see extra sheet)

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001510

A. CLASSIFICATION OF SUBJECT MATTER IPC7: C12N 15/31, C07K 14/315, C12P 21/02, C12N 15/63, C07K 19/00, A61K 39/09, A61P 31/04, G01N 33/569, A61K 38/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC7: C12N 15/31, C07K 14/315, C12P 21/02, C12N 15/63, C07K 19/00, A61K 39/09, A61P 31/04, G01N 33/569, A61K 38/16Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
GeneSeq, Delphion, Pubmed, Canadian Patent Database. Keywords: Streptococcus, pyogenes, use

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No(s).
X	BERES, SB ET AL. "Genome sequence of a serotype M3 strain of group A Streptococcus: Phage-encoded toxins, the high-virulence phenotype, and clone emergence" PROC. NAT. ACAD. SCI. USA. 99(15): 10078-10083. July 2002 also disclosed as GenBank accession Nos: AE014137 and AAM78661.1.	1-15, 17-20
Y		23, 25-29, 31-34, 36 and 37
X	FERRETTI, JJ ET AL. "Complete genome sequence of an M1 strain of Streptococcus pyogenes" PROC. NAT. ACAD. SCI. USA. 98(8): 4658-4663. April 2001 also disclosed as Genbank accession Nos: AE006478 and AAK33197.1.	1-15, 17-20
Y		23, 25-29, 31-34, 36 and 37

[x] Further documents are listed in the continuation of Box C.

[x] See patent family annex.

* Special categories of cited documents :	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

05 April 2005 (05-04-2005)

Date of mailing of the international search report

21 April 2005 (21-04-2005)

Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
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Facsimile No.: 001(819)953-2476

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001510

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No(s).
X	WO2002/34771 CHIRON S.P.A. (Telford J et al.) 02-05-2002 see SEQ ID NO: 6345 (nucleotide) and SEQ ID NO: 6346 (peptide) also disclosed as GeneSeq accession Nos: ABN69216 and ABP28585	1-20, 23, 25-29, 31-34
Y		36, 37
X	WANG. L ET. AL. "Prokaryotic essential gene #31933" GENESEQ DATABASE ACCESSION No: ACA50276 19-06-2003 (from WO2002/77183; SEQ ID NO: 38146) (ELITRA PHARM INC.)	1-15
X	WANG. L ET. AL. "Protein encoded by prokaryotic essential gene #31933" GENESEQ DATABASE ACCESSION No: ABU46406 19-06-2003 (from WO2002/77183; SEQ ID NO: 74330) (ELITRA PHARM INC.)	17-20
Y		23, 25-29, 31-34, 36, 37
P,Y	US2004/0071729 A1 ADDERSON E AND BOHNSACK J 15-04-2004 see whole document	23, 25-29, 31-34
Y	CA2413576 A1 SHIRE BIOCHEM INC. (Martin D et al.) 17-01-2001 see pp. 15-23, and examples	23, 25-29, 31-34
Y	CA2438921 A1 SHIRE BIOCHEM INC. (Martin D et al.) 29-08-2002 see pp. 15, 18, 21, 23 and examples	23, 25-29, 31-34
Y	CA2432525 A1 SHIRE BIOCHEM INC. (Martin D et al.) 27-06-2002 see pp. 17, 18, 21, 23-25, and examples continued on extra sheet	23, 25-29, 31-34

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CA2004/001510

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
WO0234771	02-05-2002	AU1412702 A	06-05-2002
		CA2425303 A1	02-05-2002
		EP1328543 A2	23-07-2003
		GB0026333D D0	13-12-2000
		GB0028727D D0	10-01-2001
		GB0105640D D0	25-04-2001
		IL154853D D0	31-10-2003
		MXPA03003690 A	05-05-2004
		WO0234771 A2	02-05-2002
EP974658		AT258601T T	15-02-2004
		AU716913 B2	09-03-2000
		AU6423198 A	20-10-1998
		CA2284555 A1	01-10-1998
		DE69821344D D1	04-03-2004
		DE69821344T T2	22-07-2004
		DK974658T T3	15-03-2004
		EP0974658 A1	26-01-2000
		JP3515314B2 B2	05-04-2004
		US6245906 B1	12-06-2001
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US2004071729	15-04-2004	AU8116801 A	18-02-2002
		CA2417357 A1	14-02-2002
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		AU1764900 A	31-07-2000
		BR9916477 A	22-06-2004
		CA2356836 A1	06-07-2000
		CN1332803 A	23-01-2002
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		EP1141306 A2	10-10-2001
		HU0104774 A2	29-04-2002
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		JP2002533123T T	08-10-2002
		MXPA01006427 A	04-06-2002
		NO20013045 A	20-08-2001
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		PL349777 A1	09-09-2002
		TR200102497T T2	21-01-2002
		TR200200633T T2	21-06-2002
		WO0039299 A2	06-07-2000
		ZA200105114 A	21-11-2002
CA2438921	29-08-2002	BR0207447 A	29-06-2004
		CA2438921 A1	29-08-2002
		EP1362106 A2	19-11-2003
		JP2004531235T T	14-10-2004
		US2003049271 A1	13-03-2003
		WO02066650 A2	29-08-2002

continued on Extra Sheet

CONTINUATION OF BOX III:

Group I: Claims 1-37, all partially, are directed to polynucleotides corresponding to the SHB GAS 102 polypeptide from *Streptococcus pyogenes* and variants thereof (SEQ ID NOS: 1, 2, 21-28); vectors and host cells comprising said polynucleotides; the SHB GAS 102 polypeptide and variants thereof; chimeric polypeptides and pharmaceutical compositions comprising said polypeptide; a process for producing said polypeptide; methods for prophylactic or therapeutic treatment of *S. pyogenes* infection using said pharmaceutical compositions; methods of diagnosing *S. pyogenes* infections using said polypeptide; uses for said pharmaceutical compositions; and kits comprising said polypeptide.

Group II: Claims 1-37, all partially, are directed to polynucleotides corresponding to the SHB GAS 103 polypeptide from *Streptococcus pyogenes* and variants thereof (SEQ ID NOS: 3, 4, 29-36); vectors and host cells comprising said polynucleotides; the SHB GAS 103 polypeptide and variants thereof; chimeric polypeptides and pharmaceutical compositions comprising said polypeptide; a process for producing said polypeptide; methods for prophylactic or therapeutic treatment of *S. pyogenes* infection using said pharmaceutical compositions; methods of diagnosing *S. pyogenes* infections using said polypeptide; uses for said pharmaceutical compositions; and kits comprising said polypeptide.

Group III: Claims 1-37, all partially, are directed to polynucleotides corresponding to the SHB GAS 104 polypeptide from *Streptococcus pyogenes* and variants thereof (SEQ ID NOS: 5, 6, 37-44); vectors and host cells comprising said polynucleotides; the SHB GAS 104 polypeptide and variants thereof; chimeric polypeptides and pharmaceutical compositions comprising said polypeptide; a process for producing said polypeptide; methods for prophylactic or therapeutic treatment of *S. pyogenes* infection using said pharmaceutical compositions; methods of diagnosing *S. pyogenes* infections using said polypeptide; uses for said pharmaceutical compositions; and kits comprising said polypeptide.

The multiple inventions identified above are not linked so as to form a single inventive concept and consequently do not comply with Rule 13 of the PCT.

SHEET 2, BOX C, CONTINUED

A CA2413450 A1
SHIRE BIOCHEM INC.
(Hamel J et al.)
27-12-2001

A CA2356836 A1
SHIRE BIOCHEM INC.
(Martin D et al.)
06-07-2000

A EP0974658A1
FUSO PHARMACEUTICAL INDUSTRIES LTD
(Ueyama H et al.)
26-01-2000

Patent Family Annex continued

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
CA2432525	27-06-2002	AU1686302 A	01-07-2002
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		CA2432525 A1	27-06-2002
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		BR0112497 A	25-11-2003
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